

**Amendments to the Drawings**

The attached sheet of drawings include changes to Figure 6. This sheet, which includes Figure 6, replaces the original sheet including Figure 6. In Figure 6, the welds that attached the control rod guide tubes to the grid cell are shown more pronounced by reference character 79. Support for this addition may be found on page 11, starting at line 9 et sec. Figure 6 has also been amended to better show that the springs in the grid cells that have springs, i.e., fuel rod support cells, are coplanar and are oriented in the vertical direction. Support for this clarification can be found on page 11, starting on line 5 and on page 11 starting on line 8.

Attachment: Replacement Sheet

Annotated sheet showing exemplary changes in red.

### **Remarks/Arguments**

In Paragraph 1 of the office action, the drawings are objected to under 37 CFR 1.83(a). The Examiner asserted that the drawings did not show every feature of the invention specified in the claims. More particularly, the Examiner asserted that the drawings did not show the relative size of the contact areas of the dimples and/or springs of the auxiliary support cells versus the main support cells. The Examiner also asserted that the features of Claims 9 and 13 were also not shown. The Examiner stated that he did not dispute that the drawings do not have to be drawn to scale. However, the Examiner asserted that the rules require that every feature recited in the claims, in this instance, the relative difference in size of the contact area of the dimples and/or springs of the inner straps of the two different grids, be shown. The Examiner concluded that none of the drawing figures illustrate the actual contact areas of any of the springs and/or dimples.

Applicants' attorney respectfully disagrees with the Examiner's position. However, for the sake of advancing prosecution, applicants have further amended Figure 6 to clearly show that the dimples and/or springs are on the vertical and they are all within the same plane. Addressing the relative dimensions, the Examiner's attention is directed to Figure 5, which clearly shows the springs on a diagonal with the contact area shown relative to the width of the cell as being substantially less than that shown for the vertical springs and dimples shown in Figure 6 relative to the cell wall width illustrated in Figure 6. The Federal Circuit in *Hockerson-Halberstadt Inc. v. Avia Group International, Inc.* (222 F.3d 951, 956, and 55 USPQ 2d 1487, 1491 Fed. Cir. 2000) stated: "It is well established that patent drawings do not define the precise proportions of the elements and may not be relied on to show particular sizes if the specification is completely silent on the issue." Thus, the court is acknowledging that the patent drawings do not have to show the precise proportions. Here, however, the specification does add to the drawings by clearly stating on page 11, starting at line 6, that the dimples and/or springs are co-planar, and on line 8, that the springs are on the vertical rather than on the diagonal. Starting at line 29, the specification specifically states: "The inner straps 76 and 78 on the auxiliary grids provide for a larger contact area between the dimple/springs and the fuel elements than are provided by the corresponding contact areas on the main support grids 46. The Court of Customs and Patent Appeals stated in *In re: Chitayat*, 408 F.2d 475, 161 USPQ 224 (CCPA 1969) that: Arguments based on mere measurement of patent drawings are of little value in absence of description in specification of relative dimensions. Here, we have both a clear statement in the specification and the

relative dimensions of the prior art springs shown in Figure 5 relative to the width of the cell walls as compared to those of this invention shown in Figure 6. The Court of Customs and Patent Appeals further stated in *In re: Wilson* 312 F.2d 449,454, 136 USPQ 188,192 (CCPA 1963) "Patent drawings are not working drawings [and arguments are not persuasive when based on a] drawing obviously never intended to show the dimensions of anything." The court further stated in *In re. Olson*, 212 F.2d 590,592, 101 USPQ 401,402 (CCPA 1954): "Ordinarily drawings which accompany an application for a patent are merely illustrative of the principles embodied in the alleged invention claimed therein and do not define the precise proportions of elements relied upon to endow the claims with patentability." It is respectfully asserted that the principles of the claims are clearly now shown in the drawings. Thus, it is respectfully requested that the objection to the drawings be removed and the amended drawings be accepted.

With regard to Claim 13, which calls for the auxiliary grids being maintained in the their axial position by being mechanically or metallurgically affixed to some of the guide tubes, reference character 79 has been added to Figure 6 to clearly show weld connections between the guide thimble and the grid straps. It is well known in the art that a weld creates a metallurgical connection between the welded members, and the references cited by the Examiner evidence that it is also well known to create a mechanical connection at that joint as a means of affixing the guide thimbles or sleeves that guide thimbles are attached to, to the cell walls. Figure 6 clearly demonstrates this principle and should now be acceptable. Accordingly, the removal of the objection to Claim 13 is also requested.

The Examiner asserted that the amendment filed 9/24/04 is objected to under 35 USC § 132 because it introduces new matter into the disclosure. The Examiner asserted that Figure 6 shows a 15 X 15 array, not a 17 X 17 array. Applicants fully agree. The earlier amendment was a typographical error. Figure 6 shows the 15 X 15 array and Figure 4 shows the 17 X 17 array. This further amendment has been made to the specification to correct this error.

In Paragraph 5 of the office action, Claims 1-5, 9, 10, 13 and 14 stand rejected under 35 USC § 102(b) as being anticipated by Leclercq (US 4,844,861). In support of this rejection, the Examiner asserted that the claimed main support grids read on grids 18 and 21 and the auxiliary grids read on grids 20, which are positioned along a mid-span of the fuel elements within the mid-third region. In support of this rejection, the Examiner asserted:

As shown in the drawings and described for example, in column 5, lines 9-12, grids 20 have dimples and springs (bosses) on each face at two levels in

contrast to grids 18 and 21, which only have the contacting dimples on one level (thus the set of dimples and/or springs on the auxiliary grids 20 have a larger contact area with the fuel elements (in fact, it is double since the set is on two levels instead of just one level) than the set of dimples and/or springs on the main support grids 18, 21).

The quoted portion of column 5, i.e., lines 9-12 of the reference, states: "Grids 20 further fulfill a function of bracing the elements provided by bosses 36,38 placed on each face at two levels and not at a single level as in the case of grid 18." There is no mention in the reference of the contact area of any of the springs or dimples. The Examiner is merely relying upon the relative dimensions shown in the drawings, which is clearly contrary to the holdings of The Court of Customs and Patent Appeals quoted above. Thus, it is respectfully asserted that the rejection is improper and the reference does not teach an auxiliary grid in the mid-third region of the fuel assembly with dimples and springs having a contact area larger than the contact area of the corresponding dimples and springs on the main support grid. Only with reference to applicants' teachings and the application of hindsight could it be said that the reference provides such a teaching, because clearly, none is expressly stated, nor should it be considered inherent since the dimensions of the dimples and springs between the two types of grids described in the reference is not stated, though the relative thickness of the grid straps is set forth in column 5, starting at line 31, and the relative pressure drop is stated in column 5 on line 45. Since it is not stated, it should not be considered inherent, especially since the drawings cannot be relied upon. In *In re Marshall* 578 F.2d 301, 198 USPQ 344 (CASC 6/30/78), The Court of Customs and Patent Appeals stated: "...to constitute an anticipation, all material elements recited in a claim must be found in one unit of prior art...An accidental or unwitting duplication of an invention cannot constitute an anticipation." Furthermore, using applicants' teachings to interpret the reference for something it does not expressly teach is clearly improper. Claim 15 has been added to the application and incorporates a combination of the subject matter of Claim 1 and 7. Claim 7 provides that the axial length of the walls of the auxiliary grid support cells is shorter than the corresponding walls of the main support grid cells. In column 5 of Leclercq it clearly states, starting at line 31, that the width of the walls of the grid straps for grids 20 is larger than the corresponding width of the grids 18. Accordingly, newly introduced Claim 15 further distinguishes over the reference.

With regard to Claim 2, the Examiner stated: "There will inherently be a grid 20 that is supported substantially midway between two of the main support grids 18 and 21.

Applicants take issue with the Examiner's interpretation of the reference since the reference teaches in column 5, starting at line 52, that the grids can be provided at variable spacing. Accordingly, it does not automatically follow that one of the grids 20 will inherently be substantially midway between the support grids 18-21. Accordingly, it is respectfully asserted the Claim 2 further distinguishes over the reference. In addition, for clarity, applicants have amended Claim 2 to identify that the auxiliary grids are positioned midway between two main support grids without any other auxiliary grids between the auxiliary grid and an adjacent main support grid.

Claim 4 calls for the fuel assembly of Claim 3 wherein adjacent ones of the plurality of auxiliary grids share one main support grid between them, which is clearly not taught by Leclercq. Claim 9 calls for the dimples and springs on the wall of the auxiliary grids being in the same plane, which is clearly not the case with regard to the grids 20. The Examiner specifically noted that the dimples and springs on the grids 20 are provided at two elevations. For this further reason, Claim 9 distinguishes over the reference. The remaining claims rejected in Paragraph 5 of the office action distinguish for the reasons noted above for the claims on which they depend, and stand or fall with those claims.

In Paragraph 6 of the office action, Claims 1, 5, 7, 9, 13 and 14 are rejected under 35 USC § 102(b) as being anticipated by Thomazet et al. (US 4,804,516). The Examiner asserted in support of this rejection that the upper grids 10-16 of Figure 2 (which the Examiner compares to applicants' auxiliary grids) can have the construction shown in Figures 5,6 and the lower grids 6-9 of Figure 2 (which the Examiner compares to applicants' claimed main support grids) can have the construction shown in Figures 7, 8 and 9. Thus, the Examiner is making the same argument that he made for Leclercq, arguing dimensions in the drawings where no corresponding dimensions are discussed in the specification. For the reasons stated above, it is respectfully asserted that this rejection is improper and should be withdrawn. Thomazet et al. teaches a fuel assembly for a pressurized water reactor to address the build-up of oxide on the cladding in the upper portions of the fuel assembly, which is a result of increased temperature in that region. In column 2, starting at line 50, the reference states:

In order to reduce this phenomenon of increased corrosion at the top part of the sheath, applicants have sought to increase the heat exchanges which occur between each fuel element and the coolant, i.e., the pressurized water in a PWR at the top part of the element. For this purpose, it is an object of the invention to provide particularly a fuel assembly of the above-defined type

wherein the upper grids situated in the upper part of the assembly are disposed at smaller intervals than the lower grids situated at the lower part of the assembly, said upper grids providing an improved flow mixing of the coolant streams.

The reference goes on to state in column 3, starting at line 8, that: "The invention also provides an assembly having upper grids provided with fins and lower grids devoid of them. Preferably, the last grid located close to the upper end of the assembly is also devoid of fins." In column 1, starting at line 54, the reference states that the grids are of three different types, consisting of median grids, designed so as to resist lateral shocks and provided with fins to create turbulence in the flow of the coolant along and inside the assembly, lower grids and upper grids ensuring the bracing of the elements and creating a lesser pressure drop. Nowhere in the reference is there a statement that the contact area of the dimples and springs of the mid-range grids are larger than those of the upper or lower grids as called for in applicants' Claims 1 and 15. Furthermore, the reference does not teach that the auxiliary grids are positioned along a mid-span of the fuel elements within the mid-third region as called for in Claim 5. To the contrary, the reference calls for the grids, the Examiner is comparing to applicants' auxiliary grids, extending from the midrange region straight through the upper region of the fuel assembly. Additionally, there is no teaching in Thomazet et al. that the axial length of the walls of the auxiliary grid support cells is shorter than the corresponding walls of the main support grids as called for in applicants' Claims 7 and 15. The only relevant statement in the reference is provided in column 1, starting at line 58, where the reference states that the lower and upper grids create a lesser pressure drop than the median grids, but that may readily be due to the fact that they do not have mixing vanes or fins. Applicants' Claim 9 states that the dimples and springs in the auxiliary grids are coplanar, while the grids of the reference, the Examiner is comparing to applicants' auxiliary grid, have dimples and springs at two levels, like Leclercq. For this further reason, Claim 9 distinguishes over the reference. The remaining claims distinguish over Thomazet et al. for the reasons noted above for the claims upon which they depend.

In Paragraph 7 of the office action, Claim 14 is rejected under 35 USC § 103(a) as being unpatentable over either Leclercq or Thomazet et al. in view of Schreiber et al. (US 4,155,807). Schreiber et al. was cited as disclosing the use of guide tabs on the outer grid straps, which would prevent hang-up with adjacent fuel assemblies during insertion or removal from the core. However, Schreiber et al. does not describe, teach or show any of the

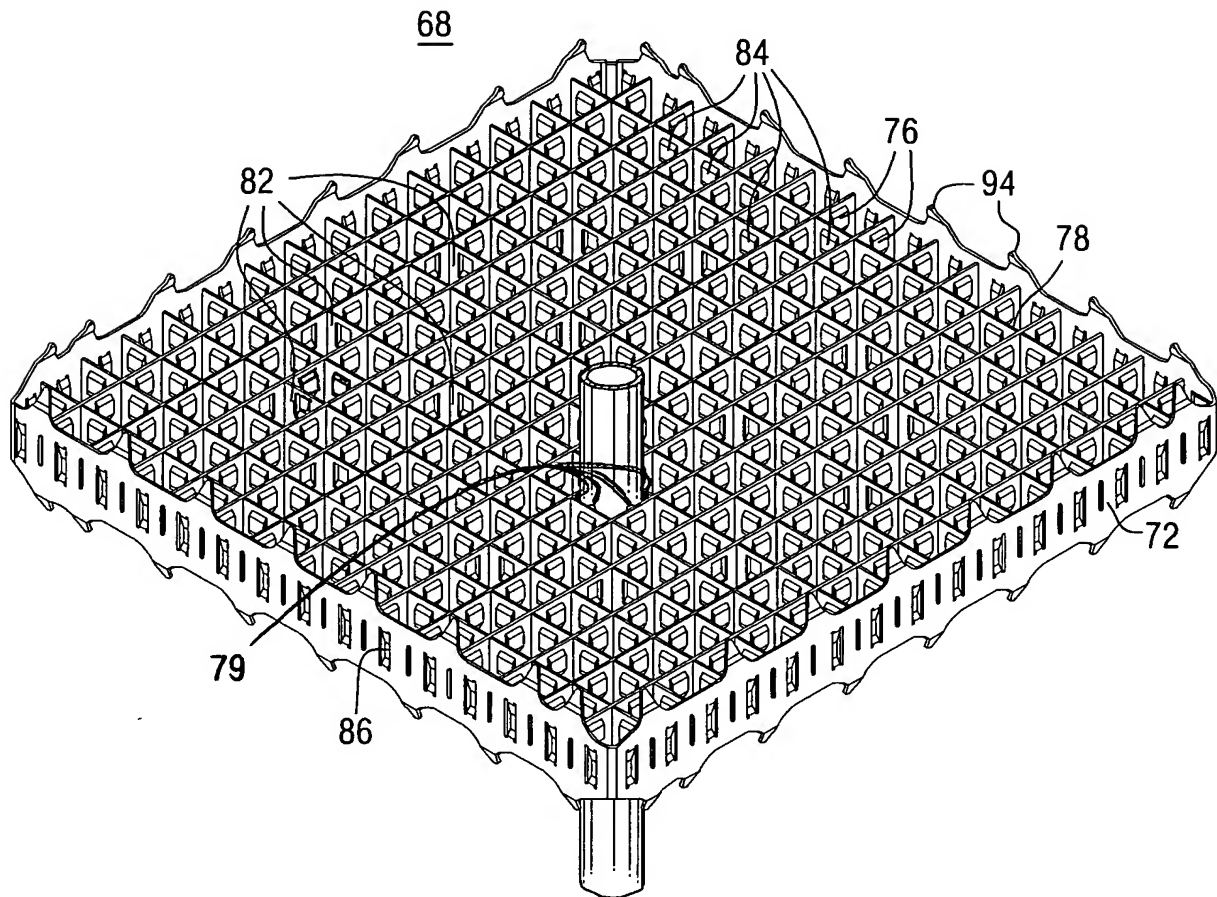
deficiencies noted above for Leclercq and Thomazet et al. Accordingly, Claim 14 distinguishes for the reasons noted for Claim 1.

In view of the foregoing, reconsideration, allowance and passage to issue of applicants' Claims 1-5, 7 and 9-15 are respectfully requested.

**Respectfully submitted,**

A handwritten signature in black ink, appearing to read "Daniel C. Abeles", with a stylized flourish at the end.

**Daniel C. Abeles  
Reg. No. 25,822  
Attorney for Applicant  
724.337.2768**



**FIG. 6**